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(54) Polymer composition.

(57) The invention relates to a polymer composition based on a polycarbonate and a graft copolymer of a vinylaromatic compound and an unsaturated nitril compound on a rubber.

This composition is characterized in that it comprises:

a) one or ore polycarbonates, and

b) a graft copolymer obtained by polymerizing, in a first step, a mixture of 10-30 % by weight of acrylonitrile, 10-75% by weight of styrene and 0-70% by weight of α-methylstyrene in the presence of a latex of a rubbery polymer and by polymerizing, in a second step, in the presence of the latex produced in the first step, a mixture of 10-30% by weight of acrylonitrile, 0-50% by weight of styrene and 40-90% by weight of α-methylstyrene.

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POLYMER COMPOSITION

The invention relates to a polymer composition based on a polycarbonate and a graft copolymer of a vinylaromatic compound and an unsaturated nitrile compound.

Such a polymer composition is known from, among other things, the German patent specifications 1.170.141 and 1.810.993 and from the Netherlands patent applications 7316731 and 7316732 laid open to public inspection.

The German patent specification 1.170.141 describes mixtures of a polycarbonate and a polymer obtained by the graft polymerization of a vinylaromatic compound and an unsaturated nitrile compound in the presence of polybutadiene.

According to the German patent specification 1.810.993, the heat resistance, the notch impact resistance and the hardness of such mixtures can be improved by mixing into them a copolymer containing at least 50 % by weight of α-methylstyrene.

According to the Netherlands patent application 7316731, the strength of the fusion seams of mixtures according to these patent specifications can be improved by applying a graft copolymer with 40 to 80 % by weight of rubber, while the average particle size of the graft copolymer is between 0.2 and 5 μm.

The Netherlands patent application 7316732 shows that the same purpose can be reached by starting from a graft copolymer with an average particle size of between 0.05 and 0.19 μm.

However, the problem of the aforementioned polymer compositions is that, with a comparable flow behaviour, the stiffness, the notch impact resistance and the dimensional stability under heat of the objects made from these polymer conditions are relatively low.

The purpose of the invention is to provide a polymer composition which does not show this problem.

The invention is therefore characterized in that the polymer composition comprises:

a. one or more polycarbonates and

b. a graft copolymer obtained by polymerizing, in a first step, a mixture of 10-30 % by weight of acrylonitrile, 10-75 % by weight of styrene and 0-70 % by weight of α-methylstyrene in te presence of a latex of a rubbery polymer and by polymerizing, in a second step, in the presence of the latex produced in the first step, a mixture of 10-30 % by weight of acrylonitrile, 0-50 % by weight of styrene and 40-90 % by weight of α-methylstyrene.

The graft polymeer preferably contains 10-40 % by weight of rubber. The limits within which the quantities of polycarbonate and graft copolymer can be varied are very wide. Generally they are between 5 and 95 % by weight of polycarbonate and 5-95 % by weight of graft copolymer.

The specific choice is determined mainly by the standards imposed upon the final product.

Preference is given to polymer compositions consisting of 40-75 % by weight of polycarbonate and 25-60 % by weight of graft copolymer, because within these limits an optimum balance of the various properties of importance, such as stiffness, dimensional stability under heat, hardness, impact resistance and flow behaviour, is obtained.

Surprisingly it has been found that in applying the specific graft copolymer according to the invention a definite improvement of the stiffness, heat stability, impact resistance and instrumented flat-headed falling dart impact energy occurs.

In those cases in which a reduced heat stability can be accepted it may be an advantage to incorporate in the polymer composition a second graft copolymer obtained by polymerizing 75-90 parts by weight of a mixture of 60-90 % by weight of styrene and 10-40 % by weight of acrylonitrile in the presence of 10-25 parts by weight of rubber.
The quantity of this second graft copolymer may be 10-50 % by weight of the total quantity of graft copolymer in the polymer composition.

The advantage of applying the second graft copolymer is that, with a slight decrease of the dimensional stability under heat, there will be a definite improvement of the flow behaviour.

In principle all thermoplastic polycarbonates are suitable for the moulding compounds of the invention. Polycarbonates are known in themselves and can be obtained by conversion of dihydroxy or polyhydroxy

compounds with phosgene or diesters of carbonic acid.

Particularly suitable dihydroxy compounds are dihydroxydiarylalkanes, including those compounds containing alkyl groups or chlorine or bromine atoms at the ortho position in respect of the hydroxyl group.

The following compounds are dihydroxydiarylalkanes which are to be preferred: 4,4'-dihydroxy 2,2 diphenylpropane (bisphenol A), tetramethylbisphenol A, tetrachlorobisphenol A, tetrabromobisphenol A and bis-(4-hydroxyphenyl) p-diisopropylbenzene. In addition to the polycarbonates, which can be prepared only from dihydroxydiarylalkanes, it is also possible to apply branced polycarbonates. For the preparation of polycarbonates of this grade a part of the dihydroxy compound, for instance 0.2-2 moles %, is replaced by a polyhydroxy compound.

Exemples of suitable polyhydroxy compounds are 1,4-bis (4',4,2'-dihydroxytriphenylmethyl)benzene, phloroglucinol, 4,6-dimethyl 2,4,6-tri-(4-hydroxyphenyl) 2-heptane, 4,6-dimethyl 2,4,6-tri-(4-hydroxyphenyl)heptane, 1,3,5-tri-(4-hydroxyphenyl) benzene 1,1,1,-tri-(4-hydroxyphenyl)ethane and 2,2-bis-[4,4-(4,4'-dihydroxydiphenyl)cyclohexyl]propane.

Polycarbonates of the aforementioned grades are described in, for instance, in the United States patent specifications 3,028,365; 2,999,835; 3,148,172; 3,271,368; 2,970,137; 2,991,273; 3,271,367; 3,280,078; 3,014,891 and 2,999,846.

The polycarbonates which are to be preferred have molecular weights of 10,000 - 60,000, more specifically of 20,000 - 40,000.

Preferably the chosen polymer composition is such that the rubber content therein is between 5 and 30 % by weight, more specifically between 10 and 20 % by weight. Within these limits of the tubber content a polymer composition is had with a good impact resistance combined with a good processability.

The preparation of the graft copolymer is carried out in emulsion. With the polymerization in aaqueous emulsion the necessary, usual auxiliaries for this purpose, such as emulsifiers, lye, salts, soaps, initiators, such as peroxides, and chain length regulators, must be applied.

Suitable chain length regulators are organosulphur compounds, such as the much used mercaptans, as well as the dialkyldixanthogens,

diarylsulphides, mercaptothiazoles, tetra-alkylthiurammono- and disulphides and the like, separately or mixed together, as well as hydroxyl compounds, such as terpinolenes. Moreover, the dimer of α-methylstyrene or an α-alkene with relatively long chain can be used as well.

The commercially most usual chain length regulators are particularly the mercapto compounds, and of these the hydrocarbylmercaptans with 8-20 carbon atoms per molecule are now much used. More specifically preference is given to mercaptans with a tertiary alkyl group.

The quantity of organosulphur compound may vary within wide limits, depending on the mixture chosen, the specific compound, polymerization temperature, emulsifier and other variables relating to the recipe. A good result can be achieved by using 0.01-5 parts by weight (per 100 parts by weight of monomer) of organosulphur compound, in which use preference is given to 0.05-2 parts. Suitable organosulphur compounds comprise n-octylmercaptan, n-dodecylmercaptan, tertiary dodecylmercaptan, tertiary nonylmercaptan, tertiary hexadecylmercaptan, tertiary octadecylmercaptan, tertiary eicosylmercaptan, secondary octylmercaptan, secondary tridecylmercaptan, cyclododecylmercaptan, cyclododecadienylmercaptan, arylmercaptan, such as 1-naphthalenethiol and the like, bis(tetra-methylthiouramdisulphide), 2-mercaptobenzathiazole and the like. Mixtures of these compounds can also be used.

As emulsifier widely different compounds can be used, such as disproportionated rosin soap, fatty acid soap, arylsulphonates, alkylarylsulphonates and other surface-active compounds and mixtures thereof. Non-ionogenic emulsifiers, such as polyethers and polyols, can also be used. The quantities of the emulsifiers used depend on the grade, as well as on the reaction parameters and the concentrations of polymerizable monomer in the emulsion polymerization system.

For the emulsion polymerization process suitable compounds supplying free radicals are organic or inorganic peroxides, hydroperoxides, azo compounds, as well as redox initiator systems. These compounds can be added at the beginning of the polymerization process. It is possible also to add these compounds partly at the beginning and partly in the course of the polymerization process.

Preferably alkali- or ammoniumpersalts and/or redox systems are chosen as initiators. Mention must be made in particular of potassiumpersulphate, ammoniumpersulphate and sodiumpersulphate.

Examples of suitable redox systems are persalts (for instance perchlorates or persulphates), tertiary butylhydroperoxide, cumenehydroperoxide, diisopropylbenzenehydroperoxide and methylcyclohexylhydroperoxide, combined with reductants based on acids containing sulphur in a low valency condition, such as sodiumformaldehydesulphoxylate, bisulphide, pyrosulphide, or with organic bases, such as triethanolamine, with dextrose, sodiumpyrophosphate and mercaptans or combinations thereof, optionally in combination with metal salts, such as ferrous sulphate. These initiators or initiator systems can be fed in one single dose, by steps or even gradually.

The initiators or initiator systems used in each of the steps of the preparation of the graft copolymer may be the same or different. It is quite possible to use a persulfate in one of the steps and a hydroperoxide in the other.

As rubber for the preparation of the graft copolymer all rubbers are in principle suitable.

Preference is give to rubber based on butadiene, such as polybutadiene and butadiene-styrene rubber. In order to obtain a polymer composition with a good impact resistance, a rubber latex with a weight-average particle size (d_{50}, determined with electron microscope) of between 0.05 and 0.70 μm is preferably started from.

The process according to which this rubber latex is prepared is preferably so controlled that highly cross-linked products are obtained. The gel content should preferably be higher than 70 % by weight (determined in methylethylketone or toluene). With a high butadiene content, this degree of crosslinking can be obtained by polymerizing to high degrees of conversion or by applying cross-linking agents, i.e. polyfunctional monomers, such as divinylbenzene or ethyleneglycoldimethacrylate.

In those cases in which the rubbers are prepared by emulsion polymerization the emulsifiers, activators and polymerization auxiliaries normally used for the preparation of the graft copolymers can be applied. Before the grafting reaction the rubber latex must be degassed in order to suppress undesired cross-linking reactions initiated by non-converted monomer.

Preference is given to the use of polybutadiene homopolymers or butadiene copolymers with a butadiene content of more than 60 % by

weight. If other dienes, for instance isoprene, or the lower alkylesters of acrylic acid, are used as comonomers, the butadiene content of the rubber can be reduced to 30 % by weight without any disadvantage occuurring with respect to the properties of the polymer composition. In principle it is also possible to prepare the graft polymer according to the invention from saturated rubbers, for instance from ethylene-vinylacetate copolymers with a vinylacetate content lower than 50 % or from ethylene-propylene-diene terpolymers (these dienes are not conjugated; examples are: 1,4 hexadiene, ethylidene norbornene, dicyclopentadiene), as well as acrylate rubber or chloroprene rubber. Mixtures of two or more rubbers can be applied as well.

The polymer composition generally contains the usual additives, such as antioxidants, pigments, processing aids, fillers, antistatics, flame retardants and the like. At the same time yet another polymer may be incorporated in the composition, such as polyphenylene oxide, poly-sulphone and the like.

Finally, the invention also relates to an object wholly or partly made from the polymer composition described above.

The polymer composition according to the invention can be used to advantage in the automotive industry and for domestic appliances.

The invention will now be elucidated by means of the following examples without being limited hereto.

The polycarbonate

In a solution of 20 parts by weight of sodium hydroxide in 250 parts of water are suspended 57 parts by weight of 2,2-(4,4'-dihydroxy-diphenyl)-propane. A clear solution is formed. After the addition of 22 parts by weight of a mixture of xylene isomerides and 0.0026 parts by weight of phenol, 6 parts by weight of phosgene are introduced into the solution at 30 °C with stirring and cooling. The mixture is then simultaneously treated with 31.5 parts by weight of phosgene and 21 parts by weight of sodium hydroxyde in 62 parts of water in the course of 1½ hours. The mixture is subsequently stirred at 80 °C for 1 hour. The colourless granular product obtained is filtered off with suction and washed until neutral. The colourless product obtained melts at 225-227 °C into a highly viscous state. The K-value is 77, corresponding to a relative viscosity of 1.775, measured in m-cresol at 25 °C.

The graft copolymer

30 pbw of a polybutadiene latex, having a solids content of 50 wt.%, 3.5 pbw of styrene, 8.8 pbw of acrylonitrile, 22.7 pbw of alphamethylstyrene, and 0.2 pbw of tert. dodecylmercaptane were added to a reactor containing 135 pbw of water and 2.0 pbw of a 15 wt.% wood-rosin emulsifyer solution.

After heating the reactor contents to approx. 45 °C, 0.4 pbw of cumenehydroperoxide and activator system were added, and the polymerization started. Due to the heat generated during the reaction the temperature of the reactor contents increased to 90 °C

After cooling the reactor contents 12.3 pbw of acrylonitrile, 22.7 pbw of alpha-methylstyrene, and 100 pbw of water were added, together with 1.0 pbw of the emulsifyer solution, 0.2 pbw of the mercaptane and 0.4 pbw of the peroxide and activator system.

When the temperature had reached 80 °C again the reactor contents was slowly cooled.

Thereafter the latex of graft copolymer was coagulated with $MgSO_4$, washed, filtered and dried.

Comparative examples 1 up to and including 26 and Examples I up to and including XVIII

Starting from a polycarbonate based on bisphenol A and a dihydroxydiarylalkene with a melt index of 16 according to ISO R 1133 and three ABS grades, a number of mixtures were made. The composition of these mixtures is shown in table 1.

The preparation of the blends listed in table 1 was as follows: all components, which were in powder form, were tumbled for 20 minutes and thereafter extruded to granulate. This granulate was further processed under the conditions given in table 2.

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Table 1

Component	Material	1	2	3*	4	5	6*	7	8	9*	10*	11*	12*	13*	14*
Polycarbonate	(pbw)	0.25	0.25	0.25	0.50	0.50	0.50	0.75	0.75	0.75	0.1	0.2	0.3	0.5	0.75
ABS	A (pbw)	0.75	-	-	0.50	-	-	0.25	-	-	-	-	-	-	-
ABS	B (pbw)	-	0.75	-	-	0.50	-	-	0.25	-	-	-	-	-	-
ABS	C (pbw)	-	-	0.75	-	-	0.50	-	-	0.25	0.9	0.8	0.7	0.5	0.25

* According to the invention

The ABS grades shown in this table are the following:

ABS-A: A graft copolymer obtained by polymerizing 80 parts by weight of styrene and acrylonitrile (weight ratio 72/28) in the presence of 20 parts by weight of polybutadiene.

ABS-B: A graft copolymer obtained by polymerizing 65 parts by weight of styrene and acrylonitrile (weight ration 70/30) in the presence of 35 parts by weight of polybutadiene.

ABS-C: A graft copolymer obtained by polymerizing, in a first step, in the presence of 15 parts by weight of polybutadiene (in latex form), 35 parts by weight of a mixture of styrene, acrylonitrile and α-methylstyrene in a weight ratio of 10/25/65 and by polymerizing, in a second step, in the presence of the latex produced in the first step, 35 parts by weight of a mixture of α-methylstyrene and acrylonitrile in a weight ratio of 65/35.

The processing conditions of the various materials are shown in table 2.

Table 2

Material	ABS A and B	C	Polycarbonate	ABS-PC blends
Pre dry time	2 hours	2 hours	4 hours	2 hours
Pre dry temperature °C	80	80	120	100
Processing temperature °C	230	250	280	250
Mould temperature °C	50	50	90	80

For testing the properties of the materials the following test methods have been applied.

Flexure test: ASTM D 790.

Impact resistance: Izod (notched) parallel and perpendicular to the direction of moulding ASTM D-256.

Dimensional stability under heat: HDT annealed and non-annealed ASTM D-648.

Table 3

Example	Material	Flexure test: E-modulus N/mm^2	strength at 5 % deflection N/mm^2	maximum flexural strength N/mm^2	tensile strength at break N/mm^2	deflection at break %	HDT annealed °C	Izod at 23 °C parallel kJ/m^2	Izod at 23 °C perpendicular kJ/m^2	Izod at -20 °C parallel kJ/m^2	Izod at -20 °C perpendicular kJ/m^2
1	A	2380 ± 10	75.5 ± 0.6	71.5 ± 0.6			87.3	17.6 ± 1.2	3.0 ± 0.8	8.9 ± 0.4	2.5 ± 1.4
2	B	1900 ± 20	61.0 ± 0.1	61.0 ± 0.1			91.4	48.5 ± 1.9	27.7 ± 2.6	34.3 ± 0.9	25.5 ± 2.6
3	C	2820 ± 30	91.1 ± 0.5	91.1 ± 0.5			104.8	15.0 ± 0.5	9.2 ± 0.3	9.0 ± 0.4	5.4 ± 1.5
4	Polycarbonate	2540 ± 20	97.9 ± 0.8	104.8 ± 0.3			135	60.4 ± 10.0	50.3 ± 8.2	9.8 ± 0.4	9.3 ± 0.3
5	1	2580 ± 10			57.1 ± 5.2	2.2 ± 0.2	94.2	1.4 ± 0.5	1.4 ± 0.7	1.5 ± 0.4	1.5 ± 0.4
6	2	2180 ± 20			56.4 ± 1.1	2.7 ± 0.1	94.8	1.8 ± 0.1	1.3 ± 0.3	1.9 ± 0.2	1.5 ± 0.4
I	3	2820 ± 30	97.3 ± 0.5	97.3 ± 0.5			112.0	19.7 ± 1.8	5.6 ± 0.9	6.1 ± 0.9	3.7 ± 0.6
7	4	2660 ± 20			55.8 ± 3.6	2.1 ± 0.1	99.9	0.8 ± 0.1	0.6 ± 0.2	0.8 + 0.1	0.7 + 0.2
8	5	2410 + 20			60.8 ± 8.6	2.7 ± 0.5	100.7	1.9 ± 0.6	1.3 ± 0.6	1.5 ± 0.3	1.2 ± 0.5
II	6	2740 ± 40	100.3 ± 0.8	101.1 ± 0.5			116.3	41.0 ± 4.0	29.6 ± 1.7	8.1 ± 1.1	7.7 ± 1.0
9	7	2630 ± 30	98.3 ± 0.5	100.8 ± 0.4			110.0	10.1 ± 0.5	7.6 ± 1.5	7.0 ± 1.5	4.8 ± 0.5
10	8	2460 ± 30			86.8 ± 4.1	4.1 ± 0.4	109.8	5.9 ± 0.8	5.3 ± 0.7	5.5 ± 0.8	1.5 ± 0.2
III	9	2650 ± 20	101.1 ± 0.6	104.3 ± 0.5			122.0	60.6 ± 6.1	54.5 ± 2.5	14.4 ± 1.2	4.0 ± 0.4

Table 4

Example	Material	Flexure test N/mm² E-modulus	strength at 5 % deflection	maximum flexural strength	HDT °C non-annealed	annealed 2 hours 105 °C	Izod kJ/m² (parallel) (inj. mldg.) +23 °C	-20 °C	(perpendicular) (inj. mldg.) +23 °C	-20 °C	Gloss °/oo
IV	10	2840 ± 20	94.8 ± 0.6	94.8 ± 0.6	90	108	8.0 ± 1.7	3.0 ± 1.2	14.8 ± 0.8	7.9 ± 0.8	46
V	11	2800 ± 40	96.7 ± 0.6	96.7 ± 0.6	96	110	6.0 ± 1.7	2.8 ± 0.4	21.1 ± 3.5	6.5 ± 1.1	49
VI	12	2810 ± 20	99.0 ± 0.4	99.5 ± 0.4	96	113	11.6 ± 4.2	4.7 ± 0.5	28.3 ± 3.0	8.2 ± 1.0	51
VII	13	2770 ± 20	102.6 ± 0.8	103.5 ± 0.7	102	116	38.8 ± 1.5	10.9 ± 2.6	43.6 ± 1.6	12.7 ± 2.7	52
VIII	14	2660 ± 50	101.9 ± 1.2	105.6 ± 1.0	113	122	64.9 ± 10.0	16.2 ± 4.3	73.7 ± 7.0	20.1 ± 2.5	56

Of a number of materials injection-moulded sheets of 3.25 mm, with fusion seams were made; for the determination of IFFIEM*. The results are mentioned in table 5.

Table 5

Example	Material	Force (N)	Energy (Nm)
15	A	2916 ± 314	14.4 ± 0.8
16	B	2766 ± 197	12.5 ± 0.8
17	C	3177 ± 92	15.5 ± 0.8
18	Polycarbonate	4790 ± 35	24.9 ± 0.4
19	1	701 ± 97	0.58 ± 0.15
20	2	615 ± 86	0.71 ± 0.33
IX	3	2986 ± 69	11.9 ± 1.5
21	4	585 ± 55	0.43 ± 0.11
22	5	708 ± 80	0.69 ± 0.10
X	6	3179 ± 174	15,7 ± 0,0
23	7	1345 ± 331	1.85 ± 0.69
24	8	1105 ± 171	1.20 ± 0.30
XI	9	3497 ± 63	16.6 ± 0.2

* IFFIEM = Instrumented flat-headed falling dart impact energy measurement.

Of a number of compounds the spiral flow length was determined using a flat spiral as described by Ebneth and Böhm in 'Plastverarbeiter' 19 (1968) pag. 261-269. The processing temperature of the material was 250 degrees celsius and the mould temperature was 80 degrees celsius.

Table 6

Example	Material	Spiral flowlength (cm)
25	c	48
XII	10	53
XIII	11	55
XIV	12	56
XV	13	52
XVI	14	40
26	polycarbonate	25

Two compounds were prepared having the following compositions (in parts by weigth) and mechanical properties.

Example		XVII	XVIII
Composition	a	10	5
	c	40	25
	pc	50	70
Melt index		6.9	4.0
Notched izod	23 °C	457	600
(j/m)	-40 °C	290	320
Vicat-temperature 5 kg (°C)		125	135
Ball-indentation hardness (mm)		3.6	2.0

CLAIMS

1. Polymer composition based on a polycarbonate and a graft copolymer of a vinylaromatic compound and an unsaturated nitrile compound on a rubbery polymer, characterized in that the polymer composition comprises:
   a. one or more polycarbonates and
   b. a graft copolymer obtained by polymerizing, in a first step, a mixture of 10-30 % by weight of acrylonitrile, 10-75 % by weight of styrene and 0-70 % by weight of α-methylstyrene in the presence of a latex of a rubbery polymer and by polymerizing, in a second step, in the presence of the latex produced in the first step, a mixture of 10-30 % by weight of acrylonitrile, 0-50 % by weight of styrene and 40-90 % by weight of α-methylstyrene.
2. Polymer composition according to claim 1, characterized in that the graft copolymer contains 10-40 % by weight of rubber.
3. Polymer composition according to claim 1 or 2, characterized in that the composition consists of
   a. 5-95 % by weight of polycarbonate and
   b. 5-95 % by weight of graft copolymer.
4. Polymer composition according to claim 3, characterized in that the polymer composition consists of
   a. 40-75 % by weight of polycarbonate and
   b. 25-60 % by weight of graft copolymer.
5. Polymer composition according to any one of claims 1-4, characterized in that, at the same time, the polymer composition contains additionally a graft copolymer obtained by polymerizing 75-90 parts by weight of a mixture of 60-90 % by weight of styrene and 10-40 % by weight of acrylonitrile in the presence of 10-25 parts by weight of a rubbery polymer.
6. Polymer composition according to any one of claims 1-5, characterized in that a polycarbonate based on a non-halogenated dihydroxydiarylalkane is applied.

7. Polymer composition as described in substance and elucidated by means of examples I-XI.
8. Object wholly or partly made from copolymer composition according to any one of claims 1-7.

CLAIMS

1. Process for the preparation of a polymer composition based on a polycarbonate and a graft copolymer of a vinylaromatic compound and an unsaturated nitrile compound on a rubbery polymer, characterized in that a polymer composition comprising
   a. one or more polycarbonates and
   b. a graft copolymer obtained by polymerizing, in a first step, a mixture of 10-30 % by weight of acrylonitrile, 10-75 % by weight of styrene and 0-70 % by weight of α-methylstyrene in the presence of a latex of a rubbery polymer and by polymerizing, in a second step, in the presence of the latex produced in the first step, a mixture of 10-30 % by weight of acrylonitrile, 0-50 % by weight of styrene and 40-90 % by weight of α-methylstyrene, is prepared.
2. Process according to claim 1, characterized in that the graft copolymer contains 10-40 % by weight of rubber.
3. Process according to claim 1 or 2, characterized in that the composition consists of
   a. 5-95 % by weight of polycarbonate and
   b. 5-95 % by weight of graft copolymer.
4. Process according to claim 3, characterized in that the polymer composition consists of
   a. 40-75 % by weight of polycarbonate and
   b. 25-60 % by weight of graft copolymer.
5. Process according to any one of claims 1-4, characterized in that, at the same time, the polymer composition contains additionally a graft copolymer obtained by polymerizing 75-90 parts by weight of a mixture of 60-90 % by weight of styrene and 10-40 % by weight of acrylonitrile in the presence of 10-25 parts by weight of a rubbery polymer.
6. Process according to any one of claims 1-5, characterized in that a polycarbonate based on a non-halogenated dihydroxydiaryl-alkane is applied.
7. Object wholly or partly made from a polymer composition prepared according to any one of claims 1-6.

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European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 81 20 1196

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
Y	US - A - 3 852 393 (SHOGI FURUKAWA et al.) * Claims; examples; column 4, line 36 to column 5, line 8 * --	1-8
Y	FR - A - 2 246 595 (DAICEL) * Claims; examples * --	1-8
Y	FR - A - 2 249 123 (DAICEL) * Claims; examples * --	1-8
Y	FR - A - 2 404 649 (BORG-WARNER) * Claims * ----	1

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

C 08 L 69/00
C 08 L 55/02
C 08 L 285/00
C 08 L 51/00

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

C 08 L 69/00
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51/00
C 08 F 285/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	02-02-1982	FOUQUIER

EPO Form 1503.1 06.78